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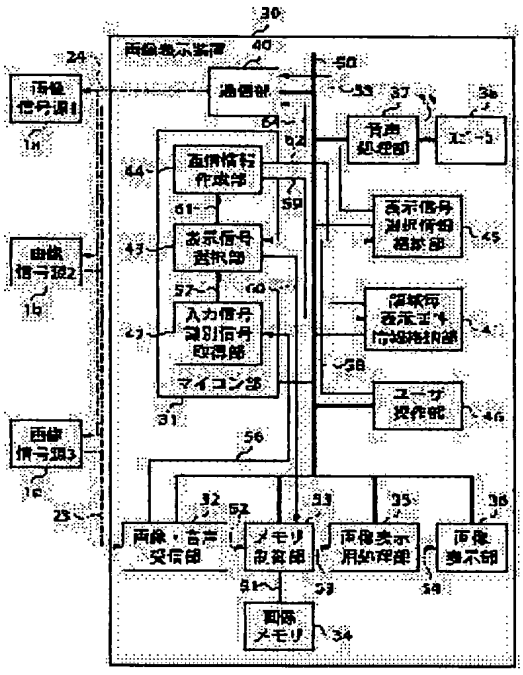
(54) DISPLAY CONTROLLER, DISPLAY CONTROL SYSTEM, DISPLAY CONTROL METHOD AND STORAGE MEDIUM

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a display control system capable of reducing an amount of information on a network by allowing signal source sides to be able to transmit an amount of information which are limited to necessary picture areas.
SOLUTION: This display control system is composed of plural picture signal sources 1a, 1b, 1c and a picture display device 30. When the system performs control for displaying respectively video signals from the plural signal sources 1a, 1b, 1c connected to transmission lines 23, 24 on plural display areas on the screen of the display device 30, picture display attribute information for every display area are stored in a display attribute information for every area storage part 41 and identification signals of video signals to be inputted are obtained by an input-signal identification signal obtaining part 42 and display selection information assigning the video signals to the plural display areas is prepared in a display signal selecting part 43 based on the obtained identification signals. Then, the stored picture display attribute information and the prepared display selection information are notified to the plural signal sources 1a, 1b, 1c connected to the transmission lines 23, 24.



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CLAIMS

[Claim(s)]
[Claim 1] The display control characterized by having an attribute information storage means to memorize the display attribute information for said every viewing area, and a notice means to notify the this memorized display attribute information to two or more sources of a signal in which it connected with said transmission line, in the display control which performs control which displays the video signal from two or more sources of a signal connected to the transmission line on two or more viewing areas on a screen, respectively.
[Claim 2] In the display control which performs control which displays the video signal from two or more sources of a signal connected to the transmission line on two or more viewing areas on a screen, respectively An acquisition means to acquire the recognition signal about the video signal from said source of a signal, A display selection information creation means to create display selection information based on the acquired this recognition signal, The display control characterized by having the display selection means which assigns said video signal to said two or more viewing areas, and a notice means to notify said created display selection information to two or more sources of a signal in which it connected with said transmission line, according to the created this display selection information.
[Claim 3] In the display control which performs control which displays the video signal from two or more sources of a signal connected to the transmission line on two or more viewing areas on a screen, respectively An attribute information storage means to memorize the display attribute information for said every viewing area, and an acquisition means to acquire the recognition signal about the video signal from said source of a signal, A display selection information creation means to create display selection information based on the acquired this recognition signal, The display selection means which assigns said video signal to said two or more viewing areas according to the created this display selection information, The display control characterized by having a notice means to notify said memorized display attribute information and said created display selection information to two or more sources of a signal in which it connected with said transmission line.
[Claim 4] The display control according to claim 2 or 3 characterized by having an image storage means to memorize two or more video signals inputted from two or more sources of a signal connected to said transmission line, and a partitioning means to secure the storage region where said each video signal is stored to said image storage means according to said display selection information.
[Claim 5] The display control according to claim 1 or 3 characterized by responding to a setup of said viewing area, and creating or changing said display attribute information.
[Claim 6] It is the display control according to claim 1 or 3 characterized by performing a setup of said viewing area by actuation of a user.
[Claim 7] The notice by said notice means is a display control according to claim 2 or 3 characterized by being carried out by modification of said display selection information being interlocked with.
[Claim 8] The notice by said notice means is a display control according to claim 1, 2, or 3 characterized by being carried out by modification of the video signal inputted being interlocked with.
[Claim 9] The notice by said notice means is a display control according to claim 1, 2, or 3

characterized by being carried out by a number of a video signal of change inputted being interlocked with.
[Claim 10] The notice by said notice means is a display control according to claim 1, 2, or 3 characterized by being carried out by change of the number of signals on the network which forms said transmission line being interlocked with.
[Claim 11] The notice by said notice means is a display control according to claim 1, 2, or 3 characterized by being carried out by change of the attribute of the signal on the network which forms said transmission line being interlocked with.
[Claim 12] The notice by said notice means is a display control according to claim 1, 2, or 3 characterized by being carried out by change of the magnitude of the viewing area on the screen of the video signal inputted or a location being interlocked with.
[Claim 13] The notice by said notice means is a display control according to claim 1, 2, or 3 characterized by being carried out by change of the magnitude of the viewing area on a screen or a location being interlocked with.
[Claim 14] The notice by said notice means is a display control according to claim 1, 2, or 3 characterized by being carried out by modification of the application of a screen area being interlocked with.
[Claim 15] The notice by said notice means is a display control according to claim 1, 2, or 3 characterized by being carried out by modification of the contents of the video signal inputted being interlocked with.
[Claim 16] The notice by said notice means is a display control according to claim 1, 2, or 3 characterized by being carried out by arrangement-related modification of two or more child screens on said screen being interlocked with.
[Claim 17] It is the display control according to claim 1, 2, or 3 characterized by performing the notice by said notice means according to the signal from said source of a signal.
[Claim 18] It is the display control according to claim 1, 2, or 3 characterized by performing the notice by said notice means according to connection of said source of a signal, or detection of powering on.
[Claim 19] The recognition signal acquired by said acquisition means is a display control according to claim 2 or 3 characterized by being the identification number given to said source of a signal.
[Claim 20] The recognition signal acquired by said acquisition means is a display control according to claim 2 or 3 characterized by being the communication link address given to said source of a signal.
[Claim 21] The recognition signal acquired by said acquisition means is a display control according to claim 2 or 3 characterized by being the identification number given for every output mode of said source of a signal.
[Claim 22] The recognition signal acquired by said acquisition means is a display control according to claim 2 or 3 characterized by being the communication link address given for every output mode of said source of a signal.
[Claim 23] The recognition signal acquired by said acquisition means is a display control according to claim 2 or 3 characterized by being the identification number given for every output channel of said source of a signal.
[Claim 24] The recognition signal acquired by said acquisition means is a display control according to claim 2 or 3 characterized by being the communication link address given for every output channel of said source of a signal.
[Claim 25] The recognition signal acquired by said acquisition means is a display control according to claim 2 or 3 characterized by being the identification number given to said video signal.
[Claim 26] The recognition signal acquired by said acquisition means is a display control according to claim 2 or 3 characterized by being the communication link address given to said video signal.
[Claim 27] The recognition signal acquired by said acquisition means is a display control according to claim 2 or 3 characterized by being the identification number given to the user of the source of a signal of said video signal.
[Claim 28] The recognition signal acquired by said acquisition means is a display control according to claim 2 or 3 characterized by being the communication link address given to the user of the source of a signal of said video signal.

[Claim 29] The display control according to claim 1, 2, or 3 characterized by performing control which displays the video signal from said source of a signal on the screen for the image display of a computer.
[Claim 30] In Display Control System which performs control which displays the video signal from two or more sources of a signal connected to the transmission line on two or more viewing areas on a screen with a display control, respectively said display control An attribute information storage means to memorize the display attribute information for said every viewing area, and an acquisition means to acquire the recognition signal about the video signal from said two or more sources of a signal, A display selection information creation means to create display selection information based on the acquired this recognition signal, The display selection means which assigns said video signal to said two or more viewing areas according to the created this display selection information, It has a notice means to notify said memorized display attribute information and said created display selection information to two or more sources of a signal in which it connected with said transmission line. Said source of a signal Display Control System characterized by having a transmitting means to transmit the video signal corresponding to said viewing area, based on said notified display attribute information and said display selection information.
[Claim 31] Said transmitting means is Display Control System according to claim 30 characterized by controlling the traffic of said video signal and transmitting based on said display attribute information and said display selection information.
[Claim 32] In the display-control approach of performing control which displays the video signal from two or more sources of a signal connected to the transmission line on two or more viewing areas on the screen of a display control, respectively in said display control The process which memorizes the display attribute information for said every viewing area, and the process which acquires the recognition signal about the video signal from said source of a signal, The process which creates display selection information based on the acquired this recognition signal, and the process which assigns said video signal to said two or more viewing areas according to the this created display selection information, It has the process which notifies said memorized display attribute information and said created display selection information to two or more sources of a signal in which it connected with said transmission line. In said source of a signal The display-control approach characterized by having the process which transmits the video signal corresponding to said viewing area based on said notified display attribute information and said display selection information.
[Claim 33] In the storage with which the program which performs control which displays the video signal from two or more sources of a signal which were performed by computer which controls a display control and were connected to the transmission line on two or more viewing areas on a screen, respectively was stored The procedure in which said program memorizes the display attribute information for said every viewing area, The procedure which acquires the recognition signal about the video signal from said two or more sources of a signal, The procedure which creates display selection information based on the acquired this recognition signal, and the this created display selection information, therefore the procedure which assigns said video signal to said two or more viewing areas, The storage characterized by including the procedure which notifies said memorized display attribute information and said created display selection information to two or more sources of a signal in which it connected with said transmission line.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to a display control, Display Control System, the display-control approach, and a storage.
[0002]
[Description of the Prior Art] Conventionally, by development of communication technology, a network in office progresses, various devices are mutually connected centering on PC, and share-ization of a function came to be realized. In recent years, standardization of the communication link between domestic devices, such as HAVI and Jini, progresses with the interface of IEEE1394, USB, etc., and the network of a domestic device is also progressing.
[0003] On the other hand, before, although TV set and the display of a personal computer (PC) were completely different things, mutual fusion progressed and the display of PC which can input TV which can display the image of PC, and TV signal has appeared.
[0004] Furthermore, in the indicating equipment of big screens, such as a projector of television of wide correspondence, a plasma display, and the rear mold projection TV and a projection mold, the scene of using various image sources, such as a movie, TV, home video, a presentation, TV meeting, and a display of various data, at office or a home is increasing. There is a demand of the multi-picture-features function which thus, divides and displays in a screen the image of the source of a picture signal where plurality differs in one screen on a display unit.
[0005] Drawing 13 is the block diagram showing the configuration of the display unit for the personal computers as a conventional common display unit. In drawing, 301 is PC as a source of a picture signal. 315 is a display unit for PC as an indicating equipment. Here, the display unit which transmits a picture signal as digital data is shown.
[0006] In the source 301 of a picture signal, 302 is CPU (central processing unit). 303 is the birth control section which controls a whole bus and a whole control bus while telling the control signal of CPU302 to each part. 311a is system bus wiring which consists of a data bus which connects each part, and a control bus. 311b is bus wiring between CPU302 and the birth control section 303.
[0007] 304 is main memory. 305 is record media, such as a hard disk. 306 is the graphic drawing section which creates the picture signal for a display, and performs the output doubled with the output image attributes (resolution, a pixel frequency, the updating frequency of a screen, a gamma property, the number of gradation, color property, etc.) to a display unit.
[0008] 307 is an image memory used at the time of the image processing of the graphic drawing section 306. 311e is the data bus and control bus between the graphic drawing section 306 and an image memory 307. 308 is the image transmitting section for transmitting the picture signal created in the graphic drawing section 306 to a display unit 315. They are the transmission component of TMDS specification which specifically adopted DVI (Digtal Video Interface) specification upon which the standardization organization DDWG of a display unit (Digital Display Working Group) decided, and the transmission component which transmits only the part which compressed the image or carried out partial rewriting.
[0009] It is a part for 309 and 310 to communicate between a display unit and PC. Here, the criterion of DDC (Display Data Channel) exists about the communication link between a display and PC. DDC is the criterion of an exchange for a computer to recognize and control a display advised by

VESA (Video-Electronic-Standard-Association) which is a display-related standardization organization.
[0010] According to this correspondence procedure, the attribute information on the display of the EDID (Extended Display Identification Data) format which VESA similarly standardized is transmitted to the PC side from a display unit side. this -- Extended Display Identification Data Standard version3 (Revision Date November [ ] -- the specifications is published as 13 and 1997.)
[0011] While DVI specification also adopts this DDC communication link and communicates between a display unit and PC, the hot plug function (function to detect the time of connecting PC with a display, and to perform a DDC communication link) is specified. 310 is the DDC communications department which performs this DDC communication link. 309 is a connection detecting element for realizing a hot plug function.
[0012] For example, at the time of display connectionless, by having connected, pull-up or a pulldown ****** cage changes with resistance to GND or power-source potential, potential changes, and the connection detecting element 309 makes display connection. 311c is a wiring group for transmitting the signal from the connection detecting element 309 and the DDC communications department 310 to the graphic drawing section 306. The control between the connection detecting element 309 and the DDC communications department 310 is controlled by CPU302.
[0013] On the other hand, in an indicating equipment 315, 317 is the microcomputer section which controls a display unit. 325a is a wiring group which consists of the control bus and data bus from this microcomputer section 317. 318 is an image receive section which changes into the format which received picture signals, such as TMDS specification transmitted from the image transmitting section 308, and was suitable for signal processing, such as RGB each color of 8 bits. 319 is a resolution transducer for performing resolution conversion for doubling the number of pixels of the image from PC with the number of display pixels of a display unit, and conversion of the renewal frequency of an image.
[0014] 320 is an image memory. 325e is the data bus and control bus of an image memory. 321 is the processing section for image display which changes a gamma property, a color property, etc. or performs character representation, such as an onscreen display, according to properties, such as liquid crystal used for the image display section, and CRT. 322 is the image display section which consists of components, such as liquid crystal, and CRT, PDP, EL, LED.
[0015] 324 is the DDC communications department which performs a DDC communication link. 323 is a connection signal feed zone which supplies the bias voltage for making it recognize to have connected etc. 325b-325d are the data buses of an image.
[0016] 314a-314c are wiring which connects between PC and a display unit. 314a is wiring of a picture signal. 314b is wiring of a DDC communication link. 314a is wiring for connection detection. Usually, 314a-314c are summarized on the cable only for [of one] images.
[0017] As this example showed, the conventional display unit for PC was connected with PC which outputs an image fundamentally by 1 to 1. The resolution of a display screen delivered and received EDID data by DDC communication link, and was determined at the time of starting of PC and connection detection of PC and a display unit.
[0018] Drawing 14 is the block diagram showing the topology between each device in the telecommunications standard between devices domestic [, such as HAVI to which decision is advanced now, and Jini,]. In drawing, 401 and 413 are the digital televisions (DTV_A, DTV_B) which can receive digital broadcasting. Here, it connects with networks, such as IEEE1394, through a set top box 402, and 401 is connected to the cables 419 only for images, such as a set top box 402 and D terminal.
[0019] Since 413 builds in the IEEE1394 decoder, it connects with the direct network. 404 is PC (PC_A). 403 is the display unit (PC Display_A). 418a is the exclusive image cable. The configuration of PC_A404, a display unit 403, and exclusive image cable 418a corresponds to drawing 13 . Moreover, 410 is PC (PC_B) similarly. 409 is the display unit (PC Display_B). 418b is the exclusive image cable.
[0020] Here, although PC_A404 and PC_B410 are connected to IEEE1394, this is used for transmission of the other signals instead of the picture signal to a display unit.
[0021] 405 is the tuner (DTV TUNER) of the digital television of another network. 406 is a digital

video (DV). 411 is a DVD disk player (DVD). 412 is a server which consists of a hard disk (HDD) for a program image transcription.
[0022] It connects with IEEE1394 and these AV equipments exchange a picture signal mutually. 414 is the modem (modem) connected to the public network 416. 416 is the telephone line connected to a public network. 407 and 408 are the hubs for branching and connecting an IEEE1394 signal. 417a-417j are the communication wires of IEEE1394 specification.
[0023] Thus, in the connected domestic network, a user realizes an usable environment from the location which various sources (DTV TUNER, DV, DVD, HDD) left on television 401 and 413.
[0024]
[Problem(s) to be Solved by the Invention] However, in the conventional domestic network, since PC was connected with the exclusive display unit by the exclusive cable 1 to 1, a digital television etc. was not able to refer PC image via the network like other AV equipments.
[0025] Moreover, since the exclusive cable was comparatively thick and could not extend a transmission distance, it had to approach and it must arrange PC and the display unit.
[0026] This is based on the following causes. That is, as the 1st cause, with the transmission system of a current display unit, when a different picture signal on the same line is transmitted, a limit of transmission speed will be exceeded. For example, in the case of the resolution of XGA (the updating period of 1024 pixel x768 pixel and 60Hz, the pixel frequency of 65MHz, each color of 8 bits), amount of information is 1056 Gbit/sec and there are more PC picture signals from the first than transmission-speed 400 Mbit/sec of IEEE1394. For this reason, the exclusive cable which performs special transmission by TMDS etc. had to be used. Although it is possible to reduce this amount of data by performing picture compression, the problem of the amount of information between networks will remain.
[0027] Since two or more picture signals are transmitted in the same wiring top when it is going to refer to from the location of arbitration by domestic network configuration even if transmission becomes possible in amount of information alone by performing picture compression, such as MPEG specification and partial rewriting, the permissible dose of transmission speed may be exceeded.
[0028] When two or more screens by multi-picture features are displayed especially, the picture signal which occupies a circuit increases and not only PC but the digital television considered on the assumption that it is transmitted in a current network is considered to have the same problem.
[0029] As the 2nd cause, since the resolution decision method of current PC and a display unit is a view on condition of 1 to 1, it does not support a many to many system peculiar to a network.
[0030] The list of the resolution which can be displayed was only shown, and actual resolution chose the graphic drawing section of PC which referred to this, and has taken the configuration which, on the other hand, sends out the output signal of the resolution applicable to a display unit to a target as the EDID data as display attribute information transmitted to PC by DDC communication link from a display unit are indicated by Extended Display Identification Data Standard version3.
[0031] For this reason, the display unit is guessing in which resolution a signal is sent out from PC by distinguishing resolution from the sent picture signal.
[0032] Therefore, even if the problem of a picture signal with much amount of information being sent in two or more sources of a signal, and a right display becoming impossible etc. exceeding the throughput of the transmission line or a display unit occurs, management cannot be performed from a display unit.
[0033] Moreover, although the display capacity of the display unit which originally also connected to the source of a signal the sources side of a signal, such as PC which is playing a role of a host computer, can be grasped, since it is not the configuration which can be grasped to the amount of information of another source of a signal linked to the display unit, such a problem cannot be prevented as a system.
[0034] Then, the source side of a signal can transmit the amount of information restricted to the required image field, and this invention aims at offering the display control which can reduce the amount of information on a network, Display Control System, the display-control approach, and a storage.
[0035] Moreover, it sets it as other purposes that this invention offers the display control with which the device of the arbitration the source side of a signal or on a network can grasp of which source of

a signal the image is displayed on the viewing area of the arbitration of the display of arbitration now, Display Control System, the display-control approach, and a storage.
[0036]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, the display control of this invention according to claim 1 In the display control which performs control which displays the video signal from two or more sources of a signal connected to the transmission line on two or more viewing areas on a screen, respectively It is characterized by having an attribute information storage means to memorize the display attribute information for said every viewing area, and a notice means to notify the this memorized display attribute information to two or more sources of a signal in which it connected with said transmission line.
[0037] In the display control which performs control which displays the video signal from two or more sources of a signal where the display control according to claim 2 was connected to the transmission line on two or more viewing areas on a screen, respectively An acquisition means to acquire the recognition signal about the video signal from said source of a signal, A display selection information creation means to create display selection information based on the acquired this recognition signal, It is characterized by having the display selection means which assigns said video signal to said two or more viewing areas, and a notice means to notify said created display selection information to two or more sources of a signal in which it connected with said transmission line, according to the created this display selection information.
[0038] In the display control which performs control which displays the video signal from two or more sources of a signal where the display control according to claim 3 was connected to the transmission line on two or more viewing areas on a screen, respectively An attribute information storage means to memorize the display attribute information for said every viewing area, and an acquisition means to acquire the recognition signal about the video signal from said source of a signal, A display selection information creation means to create display selection information based on the acquired this recognition signal, It is characterized by having the display selection means which assigns said video signal to said two or more viewing areas, and a notice means to notify said memorized display attribute information and said created display selection information to two or more sources of a signal in which it connected with said transmission line, according to the created this display selection information.
[0039] Moreover, it is desirable to have an image storage means to memorize two or more video signals inputted from two or more sources of a signal connected to said transmission line, and a partitioning means to secure the storage region where said each video signal is stored to said image storage means according to said display selection information.
[0040] Furthermore, it is desirable to respond to a setup of said viewing area, and to create or change said display attribute information.
[0041] Moreover, as for a setup of said viewing area, it is desirable to be carried out by actuation of a user.
[0042] Furthermore, as for the notice by said notice means, it is desirable to be carried out by modification of said display selection information being interlocked with.
[0043] Moreover, as for the notice by said notice means, it is desirable to be carried out by modification of the video signal inputted being interlocked with.
[0044] Furthermore, as for the notice by said notice means, it is desirable to be carried out by a number of a video signal of change inputted being interlocked with.
[0045] Moreover, as for the notice by said notice means, it is desirable to be carried out by change of the number of signals on the network which forms said transmission line being interlocked with.
[0046] Furthermore, as for the notice by said notice means, it is desirable to be carried out by change of the attribute of the signal on the network which forms said transmission line being interlocked with.
[0047] Moreover, as for the notice by said notice means, it is desirable to be carried out by change of the magnitude of the viewing area on the screen of the video signal inputted or a location being interlocked with.
[0048] Furthermore, as for the notice by said notice means, it is desirable to be carried out by change of the magnitude of the viewing area on a screen or a location being interlocked with.

[0049] Moreover, as for the notice by said notice means, it is desirable to be carried out by modification of the application of a screen area being interlocked with.
[0050] Furthermore, as for the notice by said notice means, it is desirable to be carried out by modification of the contents of the video signal inputted being interlocked with.
[0051] Moreover, as for the notice by said notice means, it is desirable to be carried out by arrangement-related modification of two or more child screens on said screen being interlocked with.

[0052] Furthermore, as for the notice by said notice means, it is desirable to be carried out according to the signal from said source of a signal.
[0053] Moreover, as for the notice by said notice means, it is desirable to be carried out according to connection of said source of a signal or detection of powering on.
[0054] Furthermore, as for the recognition signal acquired by said acquisition means, it is desirable that it is the identification number given to said source of a signal.
[0055] Moreover, as for the recognition signal acquired by said acquisition means, it is desirable that it is the communication link address given to said source of a signal.
[0056] Furthermore, as for the recognition signal acquired by said acquisition means, it is desirable that it is the identification number given for every output mode of said source of a signal.
[0057] Moreover, as for the recognition signal acquired by said acquisition means, it is desirable that it is the communication link address given for every output mode of said source of a signal.
[0058] Furthermore, as for the recognition signal acquired by said acquisition means, it is desirable that it is the identification number given for every output channel of said source of a signal.
[0059] Moreover, as for the recognition signal acquired by said acquisition means, it is desirable that it is the communication link address given for every output channel of said source of a signal.
[0060] Furthermore, as for the recognition signal acquired by said acquisition means, it is desirable that it is the identification number given to said video signal.
[0061] Moreover, as for the recognition signal acquired by said acquisition means, it is desirable that it is the communication link address given to said video signal.
[0062] Furthermore, as for the recognition signal acquired by said acquisition means, it is desirable that it is the identification number given to the user of the source of a signal of said video signal.
[0063] Moreover, as for the recognition signal acquired by said acquisition means, it is desirable that it is the communication link address given to the user of the source of a signal of said video signal.
[0064] Furthermore, it is desirable to perform control which displays the video signal from said source of a signal on the screen for the image display of a computer.
[0065] In Display Control System which performs control which displays the video signal from two or more sources of a signal where Display Control System according to claim 30 was connected to the transmission line on two or more viewing areas on a screen with a display control, respectively An attribute information storage means by which said display control memorizes the display attribute information for said every viewing area, An acquisition means to acquire the recognition signal about the video signal from said two or more sources of a signal, A display selection information creation means to create display selection information based on the acquired this recognition signal, The display selection means which assigns said video signal to said two or more viewing areas according to the created this display selection information, It has a notice means to notify said memorized display attribute information and said created display selection information to two or more sources of a signal in which it connected with said transmission line. Said source of a signal It is characterized by having a transmitting means to transmit the video signal corresponding to said viewing area, based on said notified display attribute information and said display selection information.
[0066] Moreover, as for said transmitting means, it is desirable to control the traffic of said video signal and to transmit based on said display attribute information and said display selection information.
[0067] In the display-control approach of performing control whose display-control approach according to claim 32 displays the video signal from two or more sources of a signal connected to the transmission line on two or more viewing areas on the screen of a display control, respectively The process which memorizes the display attribute information for said every viewing area in said

display control, The process which acquires the recognition signal about the video signal from said source of a signal, and the process which creates display selection information based on the this acquired recognition signal, The process which assigns said video signal to said two or more viewing areas according to the created this display selection information, It has the process which notifies said memorized display attribute information and said created display selection information to two or more sources of a signal in which it connected with said transmission line. In said source of a signal It is characterized by having the process which transmits the video signal corresponding to said viewing area based on said notified display attribute information and said display selection information.

[0068] A storage according to claim 33 is performed by computer which controls a display control. In the storage with which the program which performs control which displays the video signal from two or more sources of a signal connected to the transmission line on two or more viewing areas on a screen, respectively was stored said program The procedure of memorizing the display attribute information for said every viewing area, and the procedure which acquires the recognition signal about the video signal from said two or more sources of a signal, The procedure which creates display selection information based on the acquired this recognition signal, and the this created display selection information, therefore the procedure which assigns said video signal to said two or more viewing areas, It is characterized by including the procedure which notifies said memorized display attribute information and said created display selection information to two or more sources of a signal in which it connected with said transmission line.

[0069]

[Embodiment of the Invention] The gestalt of operation of the display control of this invention, Display Control System, the display-control approach, and a storage is explained with reference to a drawing.

[0070] [Operation gestalt of ** 1st] drawing 1 is the block diagram showing the configuration of the display unit connected to two or more sets of the sources of a picture signal. Drawing 2 is the block diagram showing the configuration of the source of a picture signal. In drawing, 1a, 1b, and 1c are the image output units (for example, PC) as two sets of sources 1, 2, and 3 of a picture signal, and these have the same configuration. In addition, the configuration of each part in drawing 2 is the same also about the source 3 (1c) of a picture signal.

[0071] On the other hand, 30 is an image display device (for example, display unit for PC). With this operation gestalt, the display unit which transmits a picture signal and a sound signal with a digital signal is used.

[0072] In the image output units 1a and 1b, 2a and 2b are CPUs (central processing unit), respectively. 3a and 3b are the birth control section which controls a whole data bus and a whole control bus while telling the control signal of CPU2a and 2b to each part.

[0073] 20a and 20b are system bus wiring which consists of a data bus which connects each part, and a control bus. 21a and 21b are bus wiring which connects between CPU2b and birth control section 3b between CPU2a and birth control section 3a, respectively. 4a and 4b are the main memory of each PC. 5a and 5b are record media, such as a hard disk and a flash memory. 6a and 6b are the graphic drawing sections which create the picture signal for a display. With this operation gestalt, the output doubled with the output image attributes (resolution, a pixel frequency, the updating frequency of a screen, a gamma property, the number of gradation, color property, etc.) to a display is performed.

[0074] 7a and 7b are image memories used at the time of the image processing of the graphic drawing sections 6a and 6b. 22a and 22b are the data buses and control buses which connect between the graphic drawing sections 6a and 6b and image memory 7a, and 7b, respectively. 8a and 8b are the sound-source sections which create a sound signal from record media and microphones, such as CD. 9a and 9b are the image and the voice transmitting section for transmitting the picture signal created in the graphic drawing sections 6a and 6b, and the sound signal created in the sound-source sections 8a and 8b to a display unit. This is equivalent to the part changed into a TMDS (Transition Minimized Differential Signaling) signal or an MPEG signal, the part which changes into an IEEE1394 signal and communicates. Moreover, compression conversion of an image and conversion to a partial rewriting signal are also performed in an image and the voice transmitting sections 9a and

9b.
[0075] 23 is the transmission line of the picture signal between the source of a picture signal, and a display unit, and a sound signal. 24 is the transmission line of the control signal between PC and a display unit.
[0076] Moreover, 10a, 11a, 12a, 13a, 14a, and 10b, 11b, 12b, 13b and 14b are the parts for communicating with a display unit. 10a and 10b are the communications departments, and receive the display attribute information and status signal selection information for every field with image attribute information, error signals, etc., such as EDID information. 11a and 11b are the display attribute information storage sections for every field, and are a part which stores the EDID information on a display unit and the display attribute information for every viewing area which were acquired.
[0077] 14a and 14b are the status signal selection information storage sections which received from each display. 12a and 12b are the amount control sections of image information, and are a part which receives the display attribute information for every viewing area which received from the display unit, and the status signal selection information in each display, and controls the graphic drawing sections 6a and 6b. 13a and 13b are the amount control sections of speech information, and are a part which receives the display attribute information for every viewing area which received from the display unit, and the status signal selection information in each display, and controls the sound-source sections 8a and 8b. In addition, the amount control sections 12a and 12b of image information and the amount control sections 13a and 13b of speech information express the function realized inside CPU.
[0078] 15a and 15b show the flow to the display attribute information storage sections 11a and 11b of the display attribute information for every viewing area of each source of a signal which received in the communications departments 10a and 10b. 16a and 16b show the flow to the status signal selection information storage sections 14a and 14b of the status signal selection information of each source of a signal which received in the communications departments 10a and 10b.
[0079] 17a and 17b show the flow from the display attribute information storage sections 11a and 11b to the amount control sections 12a and 12b of image information and the amount control sections 13a and 13b of speech information of display attribute information for every viewing area. 18a and 18b show the flow from the status signal selection information storage sections 14a and 14b to the amount control sections 12a and 12b of image information and the amount control sections 13a and 13b of speech information of status signal selection information of each source of a signal.
[0080] 26a and 26b show the flow of the amount-of-information control signal from the amount control sections 12a and 12b of image information to the graphic drawing sections 6a and 6b. 27a and 27b show the flow of the amount-of-information control signal from the amount control sections 13a and 13b of speech information to the sound-source sections 8a and 8b.
[0081] On the other hand, in an image display device 30, 31 is the microcomputer section which controls a display unit 30. 50 is a wiring group which consists of the control bus and data bus from the microcomputer section 30. 32 is the image and a voice receive section which decodes TMDS and the signal of an IEEE1394 format or elongates compressed data while receiving the picture signal and sound signal which were transmitted from an image and the voice transmitting sections 9a and 9b.
[0082] 33 is a memory control section for performing resolution conversion for doubling the number of pixels of the image from the sources 1 and 2 of a picture signal with the number of display pixels of a display unit, and conversion of the renewal frequency of a screen. 34 is an image memory used for signal processing of the memory control section 33. 51 is a wiring group which consists of the data bus and control bus of an image memory 34. 35 is the processing section for image display which changes a gamma property, a color property, etc. or performs character representation, such as an onscreen display, according to properties, such as liquid crystal used for the image display section 36, and CRT.
[0083] 36 is the image display section which consists of components, such as liquid crystal, and CRT, PDP, EL, LED. 52, 53, and 54 are the data buses of an image. 37 is the speech processing section which changes the received sound signal into the signal for reproducing by the loudspeaker 38, or amplifies. 38 is a loudspeaker. 55 is wiring between the speech processing section 37 and a

loudspeaker 38. Here, 40, 41, 42, 43, 44, and 45 are the parts about the communication link between the sources of a signal.
[0084] 40 is the communications department and transmits the display attribute information and status signal selection information for every viewing area to the PC side which is a source of a signal with conventional display attribute information, error signals, etc. of the display itself, such as EDID information.
[0085] 41 is the display attribute information storing section the whole field which stores the display attribute information for every viewing area of this display unit in addition to the conventional EDID information. 42 is the input signal recognition signal acquisition section which detects the recognition signals (the communication link address, ID number, etc.) which accompany the recognition signals (the communication link address, ID number, etc.) or each input signal of each source of an input signal from the received signal. [0086] 43 is the status signal selection section which chooses the signal displayed on each set-up viewing area at the same time it carries out a division setup of the viewing area based on a user setup, a setup from the outside, etc. 44 is the communication link information creation section which creates status signal selection information to the input signal which received the selection result of the status signal selection section 43, and the display attribute information for every viewing area created and identified based on the EDID information on a display. 45 is the status signal selection information storing section which memorizes status signal selection information. 46 is user control units, such as a mouse and an actuation key. In addition, the input signal recognition signal acquisition section 42, the status signal selection section 43, and the communication link information creation section 44 express the function realized inside a microcomputer.
[0087] 56 shows the flow of the received picture signal. 57 shows the flow of the recognition signal acquired in the input signal recognition signal acquisition section 42. 58 shows the flow of the control signal about the status signal selection by the user setting section 46. 59 shows the flow of transfer of the display attribute information for every viewing area. 60 shows the flow of the signal which controls the memory control section 33 according to selection of the status signal by the status signal selection section 43.
[0088] 61 shows the flow of the control signal which tells the selection result of the status signal by the status signal selection section 43 to the communication link information creation section 44. 62 shows the flow to the status signal selection information storing section 45 of the status signal selection information created by the communication link information creation section 44. 63 shows the display attribute information flow for every field from the display attribute information storing section 41 to the communications department 40 the whole field. 64 shows the flow of the status signal selection information from the status signal selection information storing section 45 to the communications department 40.
[0089] 23 is the transmission line which transmits an image and a sound signal. 24 is the transmission line of a control signal. In drawing, although the transmission lines 23 and 24 are shown separately, a communication link may be made to be performed on the network communication track where signal lines, such as TMDS and IEEE1394, are the same between cascade connection or the device by which tree connection was made by the same transceiver section in fact.
[0090] Actuation of Display Control System which has the above-mentioned configuration is shown. Drawing 3 is a flow chart which shows the display setting procedure of an image display device 30. This processing program is stored in ROM in the microcomputer section 31 (not shown), and is performed by same CPU (not shown) microcomputer on the staff.
[0091] First, the display attribute information (EDID information) for every present viewing area is read from the display attribute information storing section 41 the whole field (step S1). The display attribute information for every read viewing area is communicated to the source of a signal connected to the network, and each image attribute information required in order that an image display device 30 may display each viewing area now is notified (step S2).
[0092] While reading the status signal selection information which shows whether it is set up so that which input signal may be displayed on each viewing area from the status signal selection information storing section 45 now (step S3), this read information is notified to each source of a

picture signal like the display attribute information for every field (step S4). Consequently, it becomes possible to know what kind of signal will be outputted from other sources of a picture signal at the same time the source of a picture signal assigned to each viewing area outputs image information according to the display attribute information for every notified field.

[0093] The image information which the source of a picture signal has outputted according to the display attribute information for every viewing area is received in an image and the voice receive section 32 (step S5). Moreover, the recognition signal inputted into coincidence in the input signal recognition signal acquisition section 42 is acquired at this time. While changing each received picture signal into the image which suited each viewing area by the memory control section 33, it compounds to the signal for the image display sections (step S6).

[0094] It distinguishes whether a status signal is changed (step S7). When changing a status signal, by the user control unit 46 etc., the signal displayed on the viewing area to change is chosen from an input signal, and display selection information is created and changed (step S9). Then, it returns to processing of step S3, and resets up again.

[0095] On the other hand, when not changing a status signal at step S7, it distinguishes whether a viewing area is changed (step S8). By user control units, such as a mouse and a digitizer, etc., when changing a viewing area, while specifying the magnitude and the location of a viewing area to change, it changes by creating the display attribute information for every viewing area (step S10), returns to processing of step S1, and resets up again. On the other hand, this processing is ended when not changing a viewing area at step S8.

[0096] Thus, by considering the configuration of an image display device as the configuration which can transmit the display attribute information for every field, by the source side of a picture signal, it becomes possible to transmit the amount of information restricted to the required image field, and the amount of information on a network is reduced. Moreover, by having considered as the configuration which transmits the status signal selection information which shows the viewing area assigned to the identified input signal, by the device of the arbitration the source side of a picture signal, or on a network, grasp becomes [of which source of a signal the image is displayed on the viewing area of the arbitration of the display of arbitration now, and] possible, and the system which can manage the traffic on a network can be realized.

[0097] As a display attribute for every field here The number of pixels of an image display field, magnitude, The physical relationship on a flat surface, the physical relationship of the lap of windows (front arrangement, rear-face arrangement, etc.), It is not limited especially that what is necessary is just information in connection with a display, such as the updating period (a refresh rate and partial rewriting period) of a screen, the number of gradation, brightness, a gamma property, contrast, a color property, the color number, an aspect ratio, and information on transmission systems (a transmission system, a compression method, compressibility, rewriting period, etc.).

[0098] Moreover, the communication link of the display attribute information for every field, and status signal selection information Modification of the input network by the user control unit, modification of the status signal by modification of the display screen, Besides the time of modification of viewing areas, such as magnitude, a location, etc. of a viewing area on the screen of the image display section At the time of change of the number of signals inputted into the video-signal input section (an image and voice receive section 32), or the number of signals on a network At the time of change of the attribute of the signal to input or the signal on a network, at the time of modification of the application of the screen area of the image display section 36 At the time of modification of the contents of each image inputted into the image input section (an image and voice receive section 32) When there is a demand signal from the source of a picture signal at the time of arrangement-related modification of two or more child screens on the screen of the image display section 36, When connection of the source of a picture signal and the injection of a power source are detected, not only in the time of the communication link between the conventional display unit and PC By being made to perform the communication link of display attribute information and status signal selection information to the timing of the arbitration on a network, it is possible to realize flexible Display Control System also to many-to-many connection peculiar to a network.

[0099] Moreover, although status signal selection information is created to the recognition signal acquired from the input signal The identification number and the communication link address which

were given to the source of a signal of the video signal into which this recognition signal was inputted, The identification number and the communication link address which were given for every output mode of the source of a signal of an input video signal, The identification number and the communication link address which were given for every output channel of the source of a signal of an input video signal, The transmitting origin of a signal, such as an identification number given to the input video signal itself, the communication link address, and an identification number given to the user of the source of a signal of an input video signal, the communication link address, should just be recognized by a display and other devices by which network connection was carried out.

[0100] Drawing 4 is drawing showing a communication link format of the display attribute information for every field. In drawing, H1 is the communication link address of a reception place, for example, is the communication link address given to the image display device, an identification number (ID), the communication link address, an identification number (ID) which were given to the channel screen and window screen of an image display device, etc. The communication link address of a reception place is a bytes of signal, for example, is about 4 bytes in magnitude.

[0101] H2 is the communication link address of a transmitting agency, and is the communication link address given to the source of a picture signal, an identification number (ID), or the communication link address and the identification number (ID) which were given to the picture signal itself. The communication link address of a transmitting agency is b bytes of signal, for example, is about 4 bytes in magnitude. The recognition signal detected with an image display device 30 is equivalent to the data of this part.

[0102] H3 is the identification number (ID) assigned for every viewing areas, such as a channel screen set as the image display device 30, and a window screen. An identification number (ID) is c bytes of signal, for example, is about 1 byte in magnitude. H4 is a display attribute information part, and is d bytes of signal. H5 is a part which shows termination of data etc., for example, is a checksum part etc. e bytes of this part is about 1 byte in magnitude in fact.

[0103] Drawing 5 is drawing showing a communication link format of status signal selection information. In drawing, H1, H2, H3, and H5 are the same as drawing 4 . H6 is a status signal selection information part, and is f bytes in magnitude.

[0104] The case where it displays by managing amount of information with such Display Control System is shown. In order to simplify explanation, let the amount of information per second be the number of pixels x refresh rate x number of bits (unit bps). Drawing 6 is drawing showing the display screen of an image display device 30. This image display device has the number of pixels of QXGA (2048x1536 pixels), and F1 shows the whole viewing area among drawing. F2 shows the display image of PC as a source 3 (1c) of a picture signal connected to this image display device. The resolution of this image is QXGA (2048x1536 pixels), and has set the display as the viewing area whole [F1]. Moreover, as contents of an image, the activity screen of PC is displayed and a word processor and a graph are outputted.

[0105] The child screen area F3 is set as the display image of PC1a as a source 1 of a picture signal connected to this image display device. Here, the homepage image SXGA of the Internet including the information as a result of baseball etc. (1280x1024) is outputted.

[0106] The child screen area F4 is set as the display image of PC1b as a source 2 of a picture signal connected to this image display device. Here, the image of the movie of HDTV (1920x1080 pixels) reproduced in the DVD playback section which is one of the record-medium 5b is outputted.

[0107] Drawing 7 is the table showing the display attribute for every viewing area, the source of a signal, and an input recognition signal. An image display device 30 communicates the display selection information of the source of a signal assigned to the display attribute information and each viewing area for every viewing area to the device on a network. As display attribute information for every viewing area, image display attribute information, such as resolution of 1024x768 and 8 bits of gradation numbers etc., is transmitted to source of picture signal 1a. Moreover, image display attribute information, such as resolution of 720x480 and 8 bits of gradation numbers etc., is transmitted to source of picture signal 2a.

[0108] By receiving the image display attribute information for every viewing area of this, the source 1 of a picture signal changes and outputs the image of SXGA (1280x1024) to the resolution of XGA (1024x768) beforehand from the first. Moreover, the source 2 of a picture signal changes and outputs

the image of HDTV (1920x1080) to the resolution of 720x480 from the first.
[0109] Thereby, each source of a signal reduces and outputs the amount of picture signals which was 3.1Gbps to 2.1Gbps from the first as follows.
[0110]
F2: QXGA=2048x1536x60x8=1.5Gbps F3: SXGA=1280x1024x60x8= 0.6Gbps F4: HDTV=1920x1080x60x8=1.0Gbps A total of 3.1Gbps F2: QXGA=2048x1536x60x8=1.5Gbps F3: XGA=1024x768x60x8= 0.4Gbps F4:SDTV=720x480x60x8=0.2Gbps A total of 2.1Gbps drawing 8 is drawing showing the display screen of the image display device at the time of changing a viewing area. When a viewing area F4 is changed and it expands to the resolution of HDTV (1920x1080), the display attribute and status signal selection information for every new viewing area as shown in drawing 9 are communicated to the device on the source 2 of a picture signal, and other networks. Drawing 9 is the table showing the display attribute for every viewing area, the source of a signal, and an input recognition signal.
[0111] As follows, the amount of signals on a network will be calculated by modification of this viewing area, if set to 2.9Gbps.
[0112]
F2: QXGA=2048x1536x60x8=1.5Gbps F3:XGA=1024x768x60x8= 0.4Gbps F4:HDTV=1920x1080x60x8=1.0Gbps A total of the upper limit in which transmission on this network is possible being [2.9Gbps] 2.5Gbps is recognized with this Display Control System here. Therefore, since animation properties other than HDTV of a viewing area F4 are not thought as important among three images when managing the amount of information of this system by the source side of a signal, it is judged that the source 3 of a picture signal and the source 1 of a picture signal output each output image on the updating frequency of 30Hz instead of 60Hz.
[0113] This controls amount of information to a transmission possible value as follows.
[0114]
F2: QXGA=2048x1536x30x8=0.8Gbps F3: XGA=1024x768x30x8= 0.2Gbps F4: HDTV=1920x1080x60x8=1.0Gbps In this way, an image display device communicates the display attribute information and status signal selection information for every viewing area, the device of arbitration connected on the network controls transmission amount of information, the fault of degradation of image quality or a communication link using transmission overinformation is prevented, and a total of 2.0Gbps of good many screen display is realized.
[0115] Although an exchange of the EDID data (current Ver.3.0) based on the conventional DDC communication link and HAVI (Home Audio/Video Interoperability) specification (current Ver1.0) are known as an approach an image output unit receives the information on a display unit, all assume only the communication links (transmission of the number of display pixels, an aspect ratio, and an MPEG compression format etc.) of the information on all display fields.
[0116] For this reason, when transmitting two or more video signals to the screen-display field of the arbitration set up with the display unit, even if the output from each source of a video signal is a child screen, it must send the same signal as the case of all display fields, and has a possibility of exceeding the upper limit of the amount of information of the transmission line of a video signal.
[0117] Moreover, as mentioned above, it sets to a DDC communication link. Since it is the one-way traffic of the EDID information from a display unit to the source of a signal The point that resolution of the picture signal which a display unit inputs cannot be grasped correctly, From the point restricted to the time when the source of a signal was physically connected with the time of starting of PC, and a display unit, the stage to communicate Neither an image nor modification of the attributes (a viewing area, resolution, compressibility, transmission format, etc.) of the information on audio nor the communication link of control (informational selection, a halt, initiation, modification of compressibility, etc.) of amount of information was completed displaying.
[0118] Furthermore, only by sources of a signal, such as PC, grasping the video signal which self outputs, since the amount of image information mutual between two or more sources of a signal became unknown mutually, even if there were problems, like the total amount of the picture signal inputted into the input network of the same display unit exceeds a permissible dose, the amount of information by detection and mutual control of the fault was irreducible.
[0119] Although the correspondence procedure which reduces the amount of transmissions by the

transmitting side is indicated by JP,10-234020,A in transmission and reception of the image between two or more set machines, this cannot manage the amount of image information in the environment where a device which is different on the assumption that the transmitter-receiver of dedication was connected.

[0120] While suppressing the amount of information itself by having formed a means to communicate the display attribute information for every viewing area, and a means communicated status signal selection information in the display unit side with this operation gestalt, Display Control System which corresponds also to change of the output attribute of a new signal or the source of a signal flexibly is realizable by having established a means transmitted the information which grasps the amount of transmissions between the devices of a class by which it differs on a network.

[0121] In addition, the image attributes (the updating period of a screen, the number of gradation, the color, aspect ratio, etc.) of each transmission signal besides a limit (non-display in a child screen area) of an image display field, modification of the number of pixels of a screen (resolution), and modification of the updating period of a screen, modification of transmission systems (a transmission system, a compression method, compressibility, rewriting period, etc.), etc. which were showed with the above-mentioned operation gestalt are mention to the applicable control approach as a means control traffic.

[0122] [the 2nd operation gestalt] -- the 2nd operation gestalt is applied to the display by picture transmission on a network, and the case where signals of a different format, such as a picture compression signal from PC by partial rewriting and an MPEG 2 compression signal from a DTV tuner, are transmitted on the same picture transmission lines, such as IEEE1394, is shown.

[0123] Drawing 10 is the block diagram showing the configuration of Display Control System in the 2nd operation gestalt. This Display Control System consists of devices connected to the network.

[0124] In drawing, 101 and 113 are display units which perform many screen display. It connects with networks, such as IEEE1394, through a set top box (STB) 102, and a display unit 101 is connected with STB102 by the cables 119 only for images, such as a TMDS transmission system. Moreover, since the display unit 113 contains the IEEE1394 decoder, it is directly connected to the network. STB102 and a display unit 113 are equivalent to the display control and image display device of this invention, respectively. 104 is PC (PC_A) and 110 is PC (PC_B). The display of PCs 104 and 110 is also performed by display units 101 and 113 through a network.

[0125] 105 is the tuner (DTV TUNER) of the digital television of another network. 106 is a digital video (DV). 111 is a DVD disk player (DVD). 112 is a server which consists of a hard disk (HDD) for a program image transcription. It connects with IEEE1394 and these AV equipments exchange a picture signal mutually.

[0126] 114 is a modem (modem) connected to a public network 115. 116 is the telephone line connected to a public network. 107 and 108 are the hubs for branching and connecting an IEEE1394 signal. 117a-117j are the communication wires of IEEE1394 specification.

[0127] Thus, in the connected domestic network, a user realizes an usable environment from the location which various sources (PC_A, PC_B, DTV TUNER, DV, DVD, HDD) left on television (display unit) 101 and 113. Although actuation input means, such as a keyboard of PC_A and PC_B and a mouse, are not illustrated, it is operated from near each display unit through IEEE1394 etc. like an image.

[0128] The case where the display of drawing 6 and drawing 8 is realized is shown like said 1st operation gestalt using the network shown in drawing 10 . An image display device is a display which has the number of pixels of QXGA (2048x1536). F1 shows this whole viewing area among drawing. F2 shows the viewing area of the display image of PC connected to this image display device. The resolution of this image is QXGA (2048x1536 pixels), and a display is performed to the viewing area whole [F1] (screen whole). As contents of the image, the activity screen of PC is displayed and the word processor and the graph are displayed.

[0129] The display image of PC connected to this image display device is shown in the child screen area F3. The homepage image SXGA of the Internet including the information as a result of baseball etc. (1280x1024) is displayed on the field of XGA (1024x768). Moreover, it is also possible to display the image of the digital television tuner which changed the image with a resolution [of HDTV] of 1920x1080 pixels into the resolution of 1024x576 pixels on 1/4 field of a parent screen in

the child screen area F4.
[0130] Thus, in order to divide a screen area and to carry out the many screen display of the image of two or more devices on a network, it has the configuration which can transmit the display attribute information and status signal selection information for every viewing area.
[0131] Thereby, the device of the arbitration the source side of a signal or on a network can grasp of which source of a signal the image is displayed on the viewing area of the arbitration of the display of arbitration now, can reduce the traffic on a network, and can build manageable Display Control System while it transmits the image information only for the need suitable for a viewing area.
[0132] Here, the case where set to PC110 the source of a signal which sends out the image of drawing 6 and the parent screen of drawing 8 , set to PC104 the source of a signal which sends out the image of the child screen image field F3, and the source of a signal which sends out the image of the child screen area image field F4 is used as a tuner 105 is shown. Moreover, let the display control which performs these image composition and performs the display control of a display unit 101 be a set top box 102.
[0133] Drawing 11 is the block diagram showing the concrete configuration of PC104 in Display Control System, and the DTV tuner 105. Drawing 12 is the block diagram showing the concrete configuration of the set top box 102 in Display Control System, and a display unit 101. A set top box 102 is changed into the display output of a display unit while it compounds the picture signal from each source of a signal through a network.
[0134] In PC104, 202 is CPU (central processing unit). 203 is the birth control section which controls the whole data bus and a control bus while telling the control signal of this CPU202 to each part. 211a is system bus wiring which consists of a data bus which connects each part, and a control bus. 211b is bus wiring between CPU202 and the birth control section 203.
[0135] 204 is the main memory of PC104. 205 is record media, such as a hard disk. 206 is the graphic drawing section which creates the picture signal for a display. Here, the output doubled with the output image attributes (resolution, a pixel frequency, the updating frequency of a screen, a gamma property, the number of gradation, color property, etc.) to a display unit is performed.
[0136] 207 is an image memory used at the time of the image processing of the graphic drawing section 206. 211e is the data bus and control bus between the graphic drawing section 206 and an image memory 207. 208 is the image encoding section which changes and compresses the picture signal created in the graphic drawing section 206 into the partial rewriting signal for transmitting to a display unit.
[0137] 209 is an IEEE1394 communication link part which changes the compressed partial rewriting signal into an IEEE1394 signal, and communicates. 212 is an amount-of-information control section which receives the display attribute information and status signal selection information for every viewing area which received from the display unit 101, and controls the graphic drawing section 206 etc. 213 is the display attribute information storage section which memorizes the display attribute information for every viewing area which communicated from the display unit 101. 214 is the status signal selection information storage section which memorizes the status signal selection information which communicated from the display unit 101.
[0138] In a tuner 105, 238 is the microcomputer section which controls a tuner 105. 248a is a wiring group which consists of the control bus and data bus from this microcomputer section 238. 239 is the tuner section which receives a signal from an antenna and outputs an MPEG signal. 240 is the MPEG decoding section which decodes this MPEG signal and is outputted as a signal for video outlets. 248b is the signal output line.
[0139] 241 is the transducer of compressed format and changes the read MPEG signal into the compression signal of the resolution of arbitration, or the renewal frequency of a screen. 242 is the IEEE1394 communications department which changes the compressed picture signal into an IEEE1394 signal, and communicates. 243 is the display attribute information storage section which memorizes the display attribute information for every field which communicated from the display unit 101.
[0140] 244 is the status signal selection information storage section which memorizes the status signal selection information which communicated from the display unit 101. 245 is an amount-of-information control section which receives the display attribute information and status signal

selection information for every field which received from the display unit 101, and controls the graphic drawing section etc.
[0141] In STB102, 215 is a user control unit to which a user performs alter operation. 216 is the CPU section which controls this STB102. 217a is a wiring group which consists of the control bus and data bus of this CPU section 216. 218 is the IEEE1394 communications department. 219a is a decoder which decodes a partial rewriting picture signal etc. among the compression images inputted from IEEE1394, and is changed into signals, such as 24 bits of RGB usable to the operation for image composition etc. 219b is a decoder which decodes the compression signal of an MPEG system etc. among the compression images inputted from IEEE1394, and is changed into signals, such as 24 bits of RGB usable to the operation for image composition etc.
[0142] 217b and 217c are the data buses of the decoded picture signal. 220 is the image composition section which compounds the output from two or more of these decoders 219a and 219b. 221 is the memory for image composition. 217d is a wiring group which consists of the control bus and data bus of this ** for memory. 222 is the picture signal processing section which changes a gamma property, a color property, etc. or performs character representation, such as an onscreen display, according to properties, such as liquid crystal used for the image display section in the compound picture signal, and CRT. 223 is the image transmitting sections, such as VGA specification for outputting a signal to the image display device 101 which consists of components, such as liquid crystal, and CRT, PDP, EL, LED, and DVI specification. 217e and 217f are the data buses of a picture signal.
[0143] 224 is the DDC communications department for communicating EDID information between display units 101. 225 is the display attribute information storing section the whole field which stores the display attribute information for every field. 226 is the input signal recognition signal acquisition section which detects the recognition signals (the communication link address, ID number, etc.) which accompany the recognition signals (the communication link address, ID number, etc.) or each input signal of each source of an input signal from the received signal.
[0144] 227 is the status signal selection section which chooses the signal displayed on each set-up viewing area at the same time it carries out a division setup of the viewing area based on a user setup, a setup from the outside, etc. 229 is the display execution information creation section which creates status signal selection information to the input signal which the display attribute information for every viewing area created and discriminated from the selection result of the status signal selection section 227 based on the EDID information on a display.
[0145] 228 is the status signal selection information storing section which memorizes this status signal selection information. Here, the input recognition signal acquisition section 226, the status signal selection section 227, and the display execution information creation section 229 show the function realized inside CPU.
[0146] In a display unit 101, 230 is the microcomputer section which controls this display unit 101. 237a is a wiring group which consists of the control bus and data bus from this microcomputer section 230. 231 is the DDC communications department for communicating EDID information between PC, STB, etc. 232 is an image receive section which changes into the format which received picture signals transmitted from STB102, such as VGA specification and DVI specification, and was suitable for signal processing, such as RGB each color of 8 bits.
[0147] 233 is a resolution transducer which performs resolution conversion for doubling the number of pixels of the received image with the number of display pixels of a display unit 101, and conversion of the renewal frequency of a screen. 234 is an image memory used by processing of the resolution transducer 233. 237b is a wiring group which consists of the control bus and data bus of an image memory 234. 235 is the processing section for image display which changes a gamma property, a color property, etc. or performs character representation, such as an onscreen display, according to properties, such as liquid crystal used for the image display section, and CRT.
[0148] 236 is the image display section which consists of components, such as liquid crystal, and CRT, PDP, EL, LED. 237c-237e are the data buses of a picture signal. Between each device, 251 and 252 express communication wires, such as IEEE1394, and the communication link of the picture signal of a different compression method which followed the same transmission protocol with this wiring is performed. Moreover, the communication link of an amount-of-information control signal

is also performed by the same transmission route.
[0149] 245 shows wiring of a picture signal connected by cables only for images, such as VGA specification from the former, and DVI specification. 246 shows the communication wire of the DDC communication link from the former.
[0150] In STB102, 250a is the recognition signal of the input detected by Decoder A (219a). 250b shows the flow of the recognition signal of the input detected by Decoder B (219b). 250d of flow of the signal from the display execution information creation section 229 to the display attribute information storing section 225 is shown. 250e shows the display attribute information flow for every field from the display attribute information storing section 225 to the communications department 218.
[0151] 250f of flow of the control signal about the status signal selection by the user setting section is shown. 250g of flow to the status signal selection section 227 of the recognition signal acquired from the input recognition signal acquisition section 226 is shown. 250h of flow of the signal which controls the image composition section 220 according to selection of the status signal by the status signal selection section 227 is shown. 250i shows the flow of the control signal which tells the selection result of the status signal by the status signal selection section 227 to the status signal selection information creation section 229. 250j shows the flow to the status signal selection information storing section 228 created by the display execution information creation section 229. 250k shows the flow of the status signal selection information from the status signal selection information storing section 228 to the communications department 218.
[0152] In PC104, 248a shows the flow to the display attribute information storage section 213 of the display attribute information for every field among the received IEEE1394 signals. 248b shows the flow to the amount-of-information control section 212 of the display attribute information for every field read from the display attribute information storage section 213. 248c shows the flow to the status signal selection information storage section 214 of status signal selection information among the received IEEE1394 signals. 248d of flow to the amount-of-information control section 212 of the status signal selection information read from the status signal selection information storage section 214 is shown. 248e shows the flow of the control signal from the amount-of-information control section 212 to the graphic drawing section 206.
[0153] In a tuner 105, 249a shows the flow to the display attribute information storage section 243 of the display attribute information for every field among the received IEEE1394 signals. 249b shows the flow to the amount-of-information control section 245 of the display attribute information for every field read from the display attribute information storage section 243. 249c shows the flow to the status signal selection information storage section 244 of status signal selection information among the received IEEE1394 signals. 249d of flow to the amount-of-information control section 245 of the status signal selection information read from the status signal selection information storage section 244 is shown. 249e shows the flow of the control signal from the amount-of-information control section 245 to the MPEG decoder section 240 and the compression transducer 241.
[0154] With the 2nd operation gestalt, although the configuration of a display unit 101 is the same as usual, while a set top box (STB) 102 controls the transmission amount of information from the source of a signal by communicating the display attribute information and status signal selection information for every field with each source of a signal, the device of the arbitration on the source of a signal or a network manages the amount of information on a network. Moreover, a set top box 102 creates the display attribute information for every field between display units 101 with reference to the EDID information acquired by DDC communication link.
[0155] In Display Control System of the 2nd operation gestalt, a setup of a display image is performed according to the same flow chart as said 1st operation gestalt. Referring to drawing 11 and drawing 12 , drawing 3 wants to carry out the flow chart of this display setting-operation, and it is shown. This processing program is stored in ROM in the CPU section 216 in a set top box 102 (not shown), and is performed by CPU.
[0156] First, the display attribute information (EDID information) for every present field is read from the display attribute information storing section 225 for every field (step S1). To the source of a signal connected in the network, the display attribute information for every field of this is

communicated, and each image attribute required in order that this image display device 101 may display each field now is notified (step S2).
[0157] While reading whether it is set up so that which input signal may be displayed on each viewing area from the status signal selection information storing section 228 now (step S3), this information is notified to each source of a signal like the display attribute information for every field (step S4). Consequently, it becomes possible to know what kind of signal will be outputted from other sources of a signal at the same time the source of a signal assigned to each viewing area outputs image information according to the display attribute information for every notified viewing area.
[0158] The image information which the source of a signal has outputted according to the display attribute information for every viewing area is received in the IEEE1394 communications department 218 (step S5). At this time, a recognition signal is acquired by the input recognition signal acquisition section 226.
[0159] While changing each received picture signal into the image which suited each viewing area in the image composition section 220, it compounds to the signal for the image display sections (step S6). processing of the step S3 when distinguishing whether selection of a status signal is changed (step S7) and changing a status signal, after choosing from the signal which inputs the status signal changed by user control unit 215 grade and changing by creating display selection information (step S9) -- return -- it resets up again.
[0160] processing of the step S1 after changing by creating the display attribute information for every field by the user control units 215, such as a mouse and a digitizer, etc. while specifying the magnitude and the location of a viewing area to change when distinguishing whether a viewing area is changed on the other hand when not changing a status signal at step S7 (step S8) and changing a viewing area (step S10) -- return -- it resets up again. On the other hand, when not changing a viewing area at step S8, this setting processing is ended.
[0161] Thus, by considering as the configuration which can transmit the display attribute information for every field, by the source side of a signal, it becomes possible to transmit the amount of information restricted to the required image field, and it can reduce the amount of information on a network.
[0162] Moreover, by considering as the configuration which can transmit status signal selection information, the device of the arbitration the source side of a signal or on a network can grasp of which source of a signal the image is displayed on the viewing area of the arbitration of the display of arbitration now, and can realize the system which can manage the traffic on a network.
[0163] Moreover, the need it not only can transmit in the network where a picture signal and other control signals are the same, but that it is comparatively thick and a transmission distance uses the cable of dedication of 10m or less like the cable of the TMDS method of the conventional VGA specification or DVI specification is lost. Thereby, the body of PC and a display unit can detach distance, and can install it.
[0164] Furthermore, integration of the household-electric-appliances network of AV systems, such as DVD, and digital broadcasting, DV, and the image of PC is attained, and they become controllable by the same control means on the same display.
[0165] In addition, although the above is explanation of the gestalt of operation of this invention, this invention is not restricted to the configuration of the gestalt of these operations, and it is applicable, no matter it may be what thing, if it is the configuration that the function shown by the claim or the function which the configuration of the gestalt of operation has can be attained.
[0166] Moreover, it cannot be overemphasized that this invention can apply the record medium which memorized the program code of the software which realizes the function of the operation gestalt mentioned above also when attained by supplying a program to a system or equipment. In this case, the program code itself read from the storage will realize the new function of this invention, and the storage which memorized that program will constitute this invention.
[0167] With the above-mentioned operation gestalt, the program code shown in the flow chart of drawing 3 is stored in ROM which is a storage. As a storage which supplies a program code, the memory card of a floppy (trademark) disk, a hard disk, an optical disk, a magneto-optic disk, CD-ROM, CD-R, DVD, a magnetic tape, and a non-volatile etc. can be used, for example.

[0168]
[Effect of the Invention] According to this invention, by considering as the configuration which can transmit the display attribute information for every field to two or more sources of a signal, the source side of a signal can transmit the amount of information restricted to the required image field, and can reduce the amount of information on a network.
[0169] Moreover, the device of the arbitration the source side of a signal or on a network can grasp of which source of a signal the image is displayed on the viewing area of the arbitration of the display of arbitration now by considering as the configuration which can transmit display selection information. Thereby, the system which manages the amount of image information on a network is realizable.

[Translation done.]

* NOTICES *

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1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the configuration of the display unit connected to two or more sets of the sources of a picture signal.
[Drawing 2] It is the block diagram showing the configuration of the source of a picture signal.
[Drawing 3] It is the flow chart which shows the display setting procedure of an image display device 30.
[Drawing 4] It is drawing showing a communication link format of the display attribute information for every field.
[Drawing 5] It is drawing showing a communication link format of status signal selection information.
[Drawing 6] It is drawing showing the display screen of an image display device 30.
[Drawing 7] It is the table showing the display attribute for every viewing area, the source of a signal, and an input recognition signal.
[Drawing 8] It is drawing showing the display screen of the image display device at the time of changing a viewing area.
[Drawing 9] It is the table showing the display attribute for every viewing area, the source of a signal, and an input recognition signal.
[Drawing 10] It is the block diagram showing the configuration of Display Control System in the 2nd operation gestalt.
[Drawing 11] It is the block diagram showing the concrete configuration of PC104 in Display Control System, and the DTV tuner 105.
[Drawing 12] It is the block diagram showing the concrete configuration of the set top box 102 in Display Control System, and a display unit 101.
[Drawing 13] It is the block diagram showing the configuration of the display unit for the personal computers as a conventional common display unit.
[Drawing 14] It is the block diagram showing the topology between each device in the telecommunications standard between devices domestic [, such as HAVI to which current decision is advanced, and Jini,].
[Description of Notations]
1a, 1b, 1c Source of a signal
23 24 Transmission line
30 Image Display Device
31 Microcomputer Section
41 It is Display Attribute Information Storing Section the Whole Field.
42 Input Signal Recognition Signal Acquisition Section
43 Status Signal Selection Section
44 Communication Link Information Creation Section
45 Status Signal Selection Information Storing Section
46 User Control Unit

[Translation done.]

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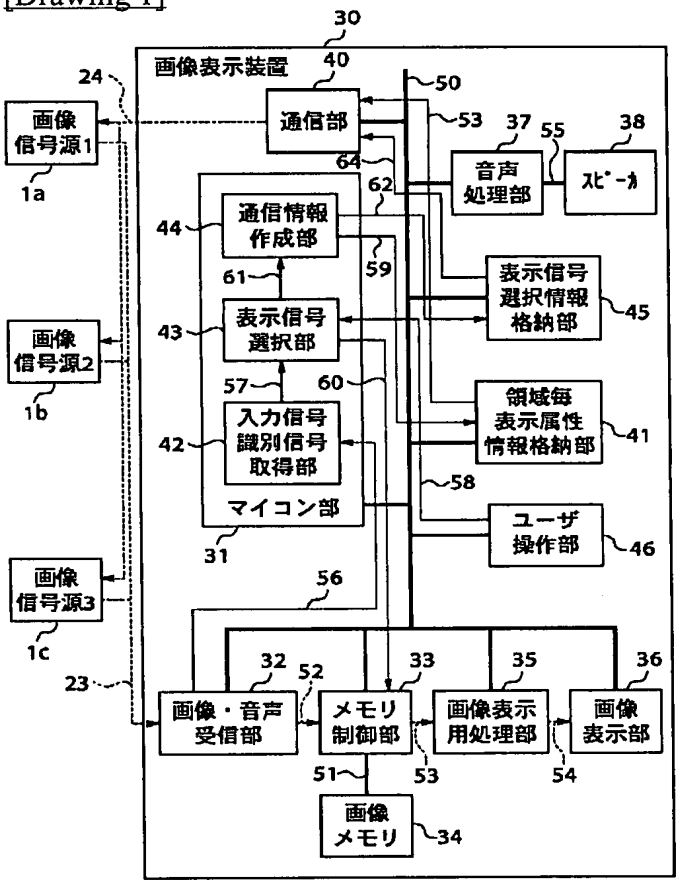
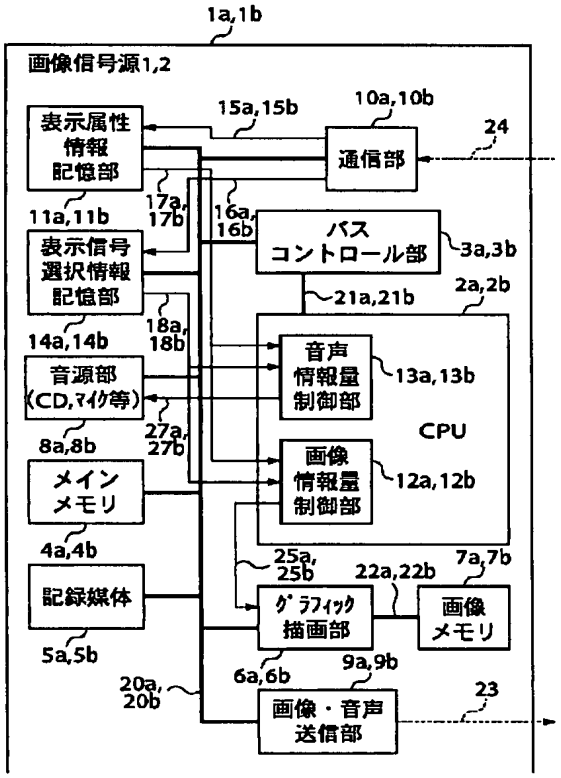
DRAWINGS

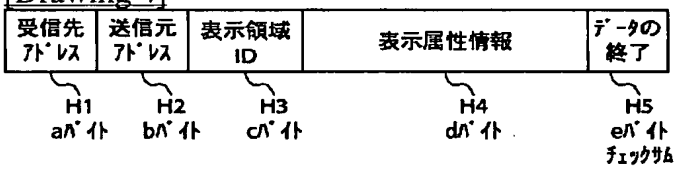
[Drawing 1]



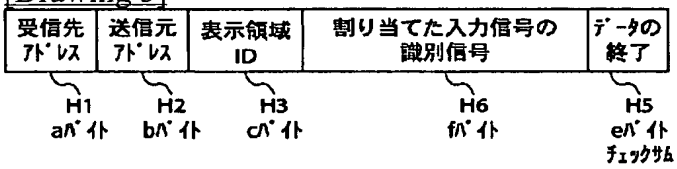
[Drawing 2]



[Drawing 4]



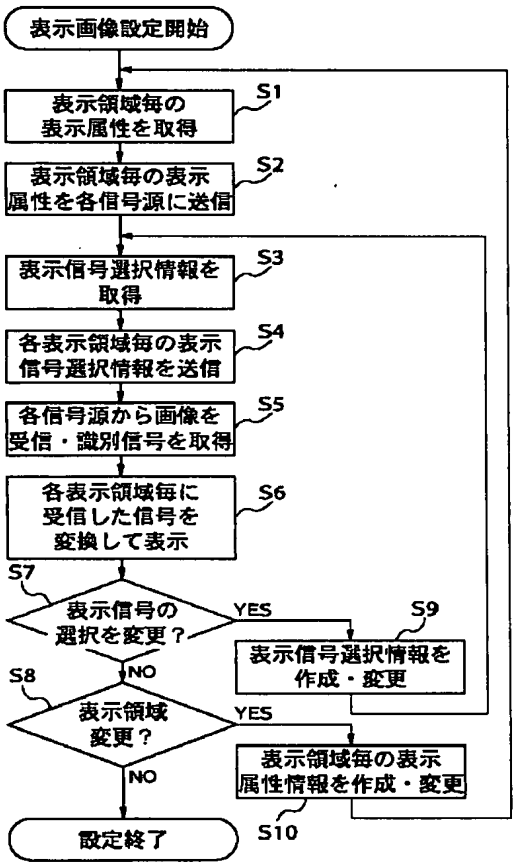
[Drawing 5]



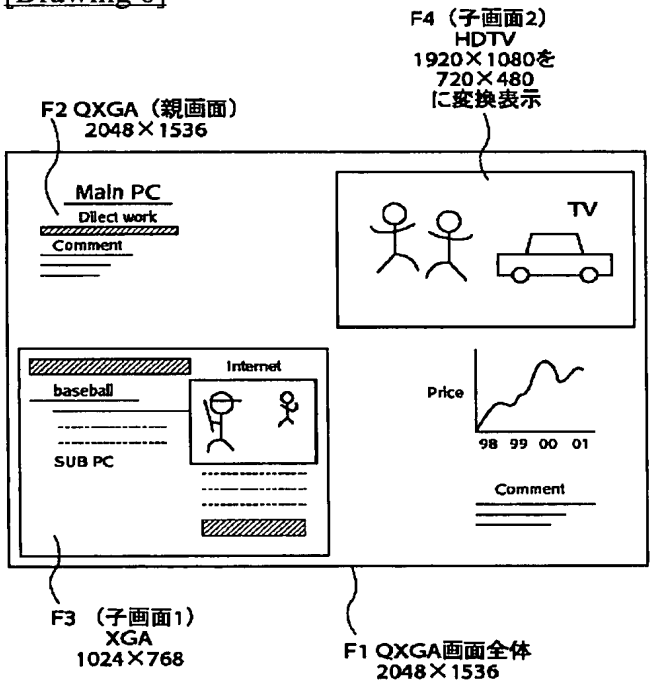
[Drawing 7]

表示領域	F2	F3	F4
領域毎の表示属性	解像度：QXGA 階調数：8bit	解像度：XGA 階調数：8bit	解像度：SDTV 階調数：8bit
割り当てた信号源	PC1	PC2	DVD
入力識別信号	PC1の通信アドレス	PC2の出力信号の識別ID	DVDの通信アドレス

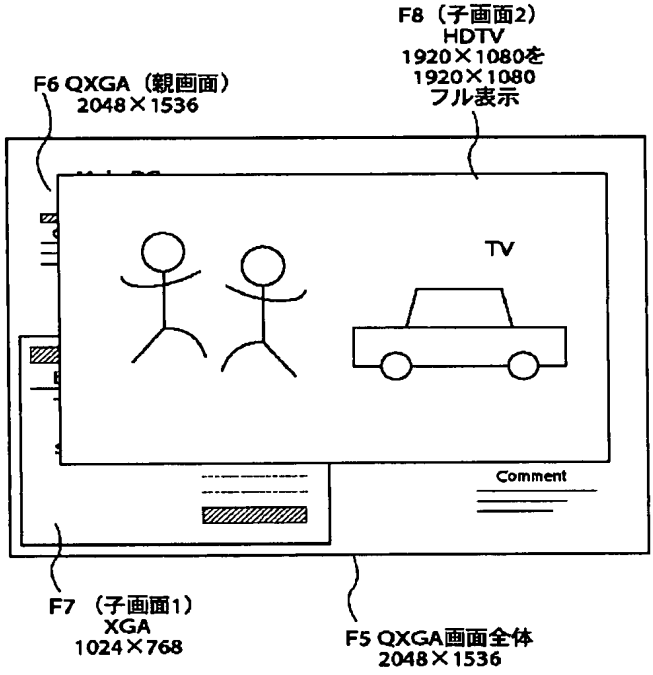
[Drawing 3]



[Drawing 6]



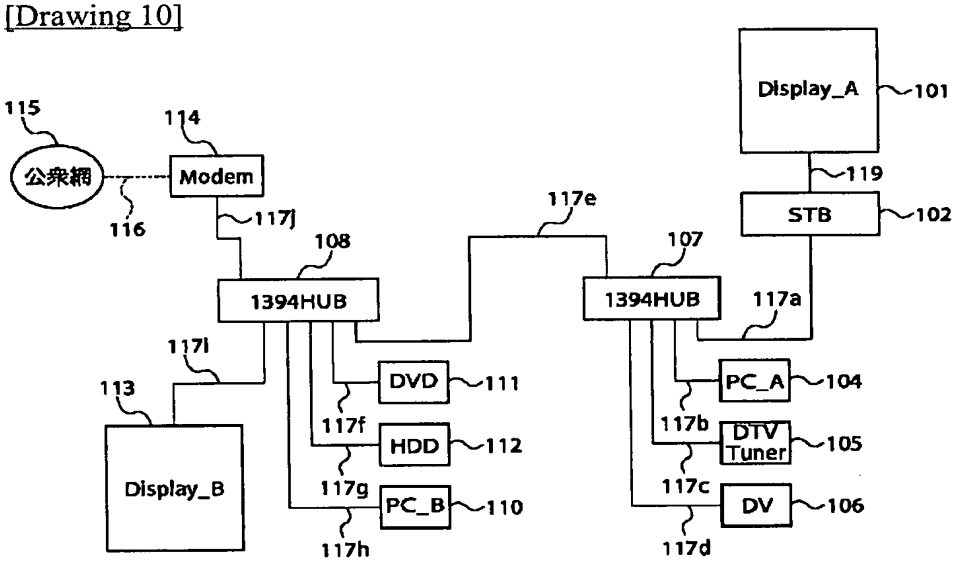
[Drawing 8]



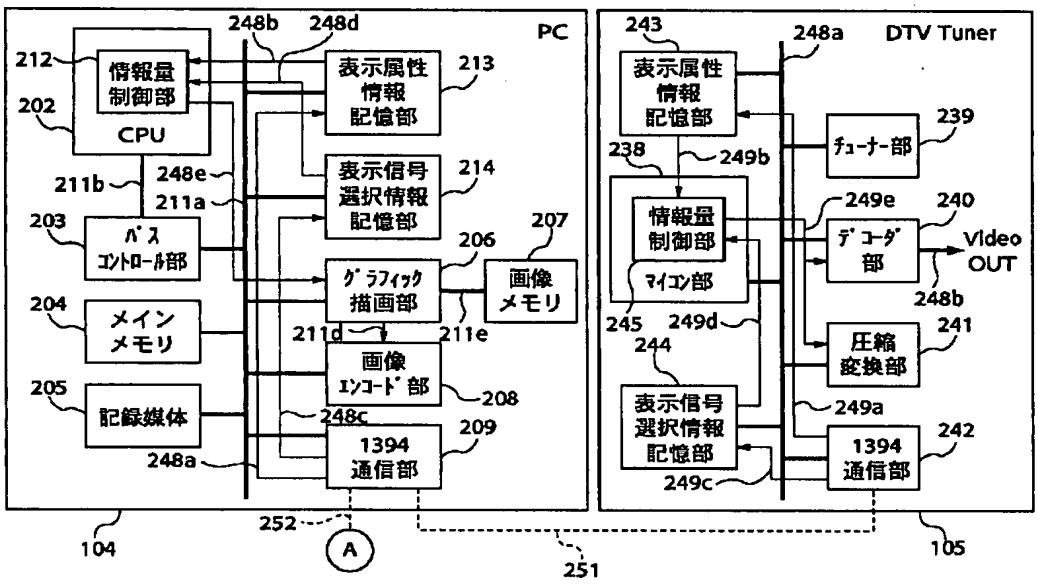
[Drawing 9]

表示領域	F2	F3	F4
領域毎の表示属性	解像度：QXGA 階調数：8bit	解像度：XGA 階調数：8bit	解像度：HDTV 階調数：8bit
割り当てた信号源	PC1	PC2	DVD
入力識別信号	PC1の通信アドレス	PC2の出力信号の識別ID	DVDの通信アドレス

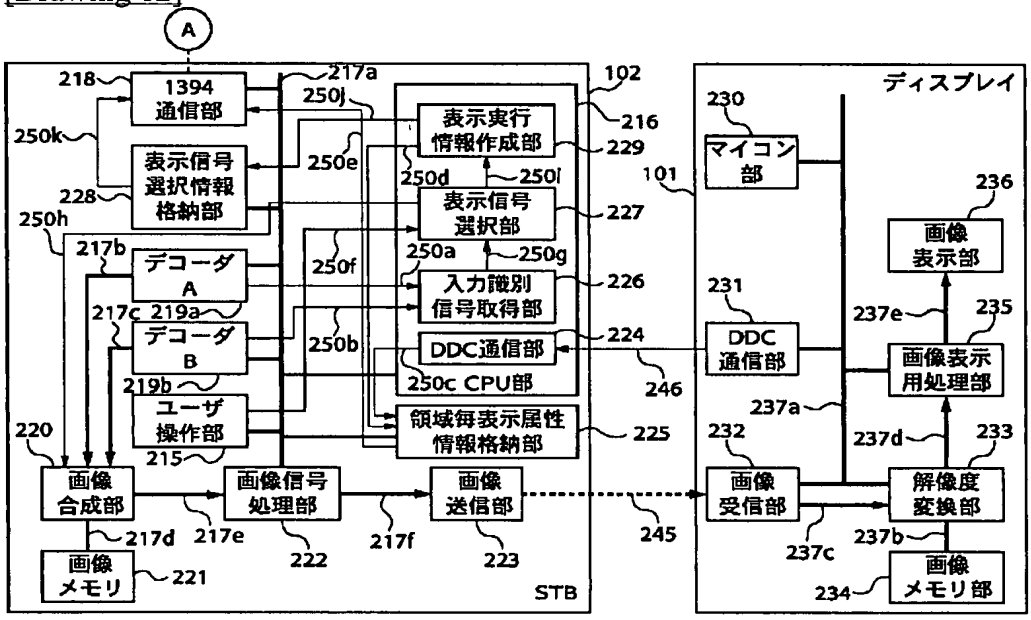
[Drawing 10]



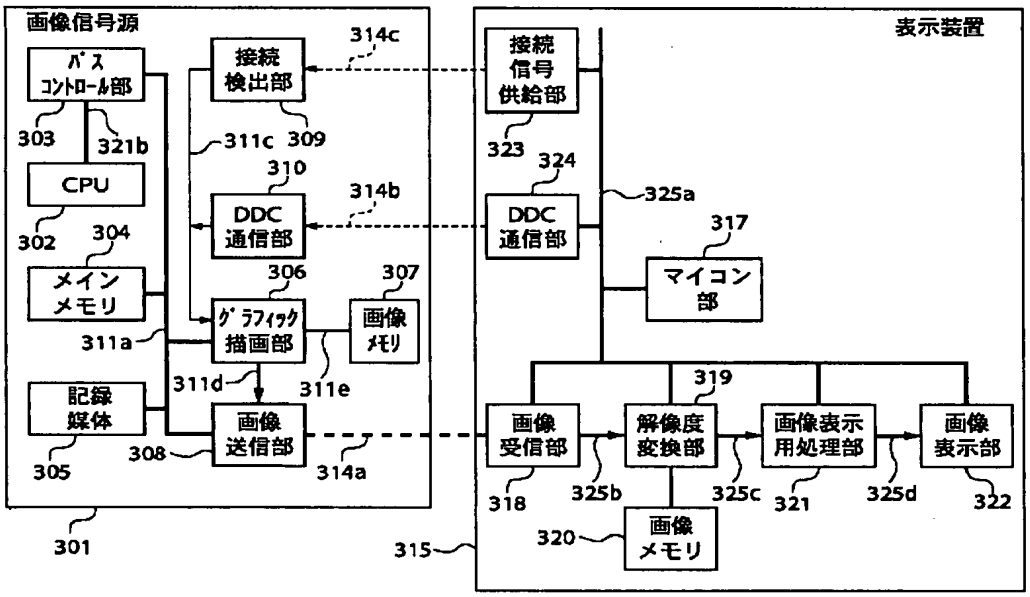
[Drawing 11]



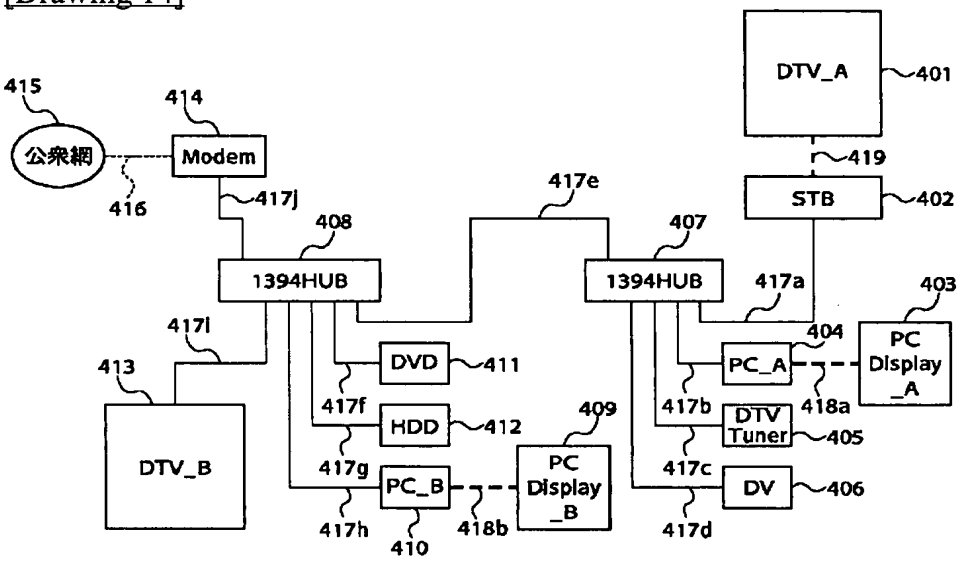
[Drawing 12]



[Drawing 13]



[Drawing 14]



[Translation done.]